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12/8/98

Versar INC.

December 8, 1998

Vince L. Epps
IDEM
100 North Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015

Michael McAteer
USEPA, HSRW-6J
77 West Jackson Blvd.
Chicago, IL 60604-3590

Re: Enviro-Chem RRA, Zionville, Indiana,
Results of Pumping Test Performed on Hot Spot #2 Well (Well HS-2)

Dear Sirs:

Recently Versar, Inc. (Versar) conducted a 120 hour pumping test on Hot Spot Well HS-2 located within the southern portion of the subject site, and conducted laboratory analyses on samples of the containerized pumping water. The work was performed in accordance with the October 7, 1998 *Revised Hot Spot #2 Work Plan* prepared by Versar on behalf of the Enviro-Chem Trust and submitted to Indiana Department of Environmental Management (IDEM) and the U.S. Environmental Protection Agency (USEPA). The purpose of the pumping test was to evaluate the possibility (if any) of a hydraulic connection between the two Hot Spot areas and/or the surrounding wells, and to assess the quality of the groundwater beneath the Hot Spot #2 area. The site plan/well location map is included as Figure 1.

Procedures

The Well HS-2 pumping test began on November 9, 1998, and lasted approximately 120 hours, ending on November 14, 1998. During the test, groundwater elevations were monitored within the pumping well (Well HS-2), the two Hot Spot #1 wells (Wells HS-1 and HS-1A), and surrounding on-site monitoring wells, specifically Wells S-2, S-3, T-9 and IW-5. Drill logs, including well construction diagrams, for the three hot spot wells (Wells HS-1, HS-1A, and HS-2) are included in Attachment A. The other wells were not installed by Versar.

Prior to the beginning of the pumping test, pressure transducers for a two channel In-Situ Hermit™ Data Logger were installed near the bottom of Wells HS-1 and HS-2 in order to collect water level measurement. Periodic manual water-level measurements were collected from all seven wells, including HS-1 and HS-2. The water level readings are included in Attachment B. Groundwater drawdown versus time plots of the water level readings are enclosed as Attachment C. Permeability calculations, including a semi-log plot of drawdown versus time for the pumping well (Well HS-2), are presented in Attachment D.

Based on yield values obtained during development of the recently installed Well HS-2, the pumping rate for the test was set at 2.5 gallons per minute (gpm). The intake of the pump, a Grundfos™ ReadyFlow2, was placed approximately one foot from the bottom of the 16 foot deep recovery well. An in-line flow meter was used to gauge the 2.5 gpm flow rate. The purge water was discharged into a clean Frac tank present at the site. Two samples of the stored purge water were collected within the first and last 24 hours of the test. The samples were collected from a manhole in the top of the Frac tank via disposable bailers, and were placed in laboratory-supplied containers. The two purge water samples, labeled FT and FT2, respectively, were placed on ice and delivered by courier to National Environmental Testing, Inc. (NET) of Indianapolis, Indiana for volatile organic compounds (VOCs) analysis using USEPA Method 8260. The laboratory analytical results are enclosed as Attachment E.

Results and Conclusions

Versar has the following results and conclusions based upon the compilation and assessment of the field observations and laboratory analytical results derived from the recent pumping test of Well HS-2 located within Hot Spot #2:

- A hydraulic connection was observed between the pumping well (Well HS-2) in Hot Spot #2 and the deeper of the two Hot Spot #1 wells (Well HS-1A).

  As indicated in the drawdown versus time plots for Wells HS-2 and HS-1A, the cone of groundwater depression associated with the pumping in Well HS-2 had a maximum sustained drawdown of approximately 1.0 foot in Well HS-2 and of approximately 0.6 foot in nearby Well HS-1A. Furthermore, the drawdown curves for both wells are similar in shape and response time.

- None of the remaining wells monitored during the pumping test, including Hot Spot #1 well (HS-1), were effected by the drawdown in Well HS-2, but all of the wells were affected by a local rain storm event.

  The drawdown curves for Wells HS-1, S-2, S-3, T-9 and IW-5 appeared unaffected by the pumping in Well HS-2. The only regional hydraulic impact to these wells was the groundwater recharge associated with two consecutive periods of heavy rain within one storm event, which commenced shortly after the initiation of the test and lasted approximately 16 hours. The effect that this storm had on the regional groundwater can be observed in all seven wells as a single or double "hump" in the well drawdown curves between approximately 0 minutes and 2,500 minutes (see Attachment C).

- Well HS-2 (Hot Spot #2 Well) yielded a flow of 2.5 gpm and an average hydraulic conductivity of 1.17×10^{-5} ft/sec in the saturated zone located at a depth of 13 to 16 feet within the well.

  The hydraulic conductivity for Well HS-2 was calculated from the log-log plot of hydraulic head versus time curve for the first 20 minutes of the pumping test (see Attachment E), prior to the onset of the rain storm event. The calculated hydraulic conductivity and observed yield for Well HS-2 are consistent with data collected during the installation of this well. Specifically, at a depth of 12 to 14 feet the well intersects a sand and gravel layer. The 1.17×10^{-5} ft/sec hydraulic conductivity is typical of sandy units (Freeze and Cherry, 1979), such as the one observed in the lower portion of Well HS-2.

- The samples collected from the purge water stored in the on-site Frac tank had elevated VOC concentrations in excess of the Acceptable Subsurface Water Concentrations included in *Revised Exhibit A* Table 3-1 Cleanup Standards.

  Concentrations of several VOCs including 1,1-dichloroethene, cis-1,2-dichloroethene, methylene chloride, trans-1,2-dichloroethene, tetrachloroethene, 1,1,1-trichloroethane, and vinyl chloride exceeded the Acceptable Subsurface Water Concentrations included in *Revised Exhibit A* Table 3-1 Cleanup Standards.

Recommendations

Based on the results of the pumping test and groundwater laboratory analyses, Versar has the following recommendations which are consistent with the October 7, 1998 *Revised Hot Spot #2 Work Plan*:

- Both hot spot areas and the Frac tank purge water will be treated with Fenton reagents. However, since a hydraulic connection exists between Wells HS-2 and HS-1, the Hot Spot #2 area will be treated three to six weeks prior to the Hot Spot #1 area. The water in the Frac tank will be treated at the same time as the Hot Spot #2 area, and will subsequently be pumped through the on-site water treatment system for polishing before being discharged.

- The effectiveness of the Fenton reagent treatment will be monitored via by-weekly sampling (for a period of two months) of Wells HS-2, HS-1 and HS-1A for VOCs, semi-volatile organic compounds (SVOCs), total organic carbon (TOC), dissolved oxygen (DO), redox potential, hydroxyl radical, pH, temperature, and conductivity.

- If residual organics remain in the wells of concern, a second Fenton reagent application will be considered upon an analysis of the data. The treatment effectiveness will be measured with respect to water samples taken from the hot spot and recovery wells that are assumed to be in equilibrium with soil compared to the Acceptable Subsurface Water Concentrations included in *Revised Exhibit A* Table 3-1 Cleanup Standards.

If you have any questions or comments please contact George at (215) 788-7844, extension 222.

Very truly yours,

/Bernard Bisker for

David V. Stockar, P.E.
Senior Hydrogeologist

Charles J. Raffaele
FOR

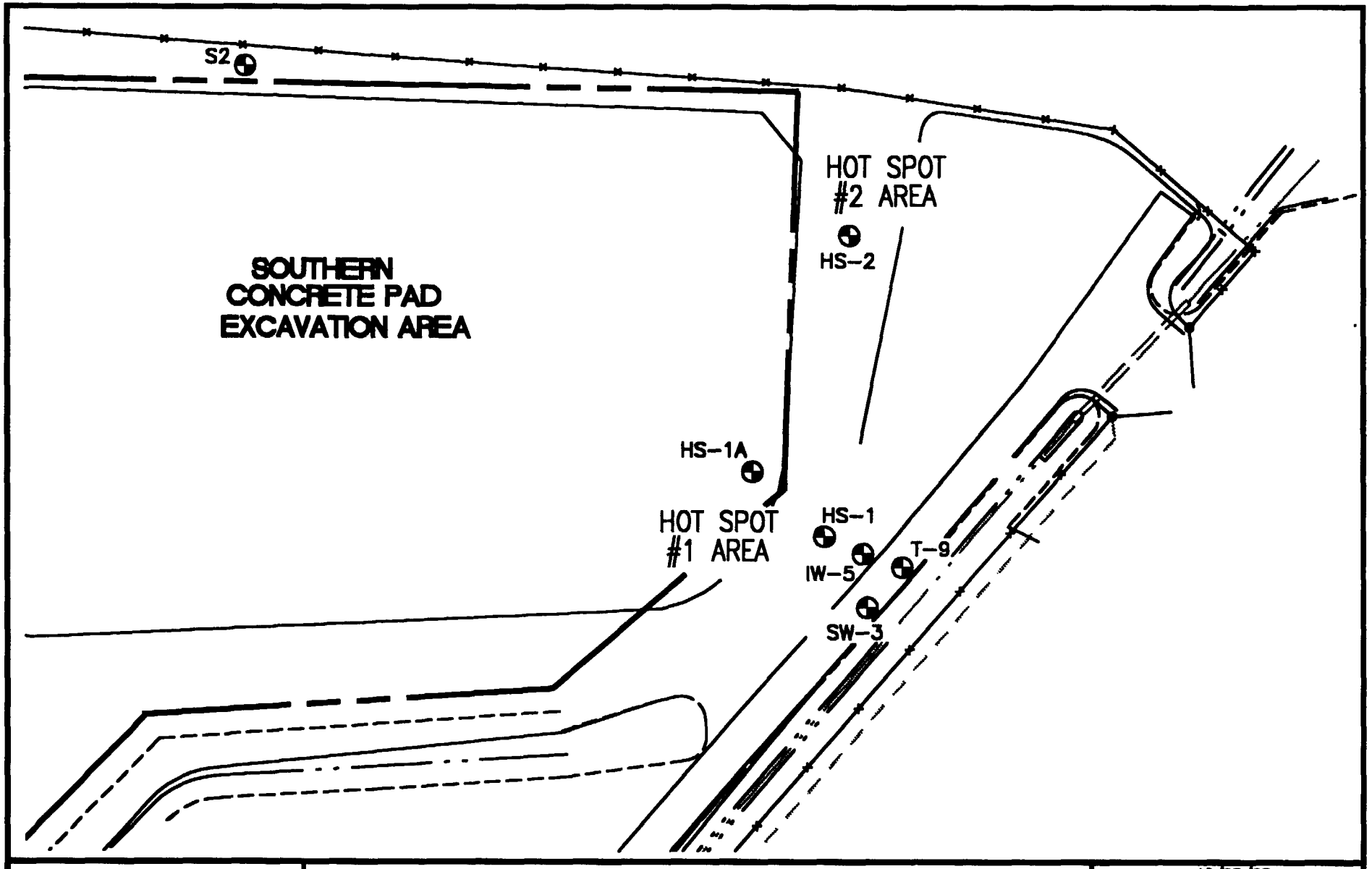
G. J. Anastos, Ph.D., P.E.
Project Manager

Attachments

cc: R Ball
N Bernstein
M Dowiak
R Hutchens

References

Freeze, R. Allen & John A. Cherry (1979), Groundwater, Prentice-Hall, Inc., Englewood Cliffs, N.J.



Versar INC.
1900 FROST ROAD, SUITE 110
BRISTOL, PA 19007
(215) 788-7844

ENVIROCHEM

FIGURE 1 - WELL LOCATION MAP

ZIONSVILLE, INDIANA

DATE:	12/03/98
DESIGNED BY:	T. WILLANS
SCALE:	NOT TO SCALE
JOB NO.:	3709.001
DWG. NO.:	9812100

Versar INC.

ATTACHMENTS

Versar INC.

ATTACHMENT A
Drilling Logs

Versar INC.

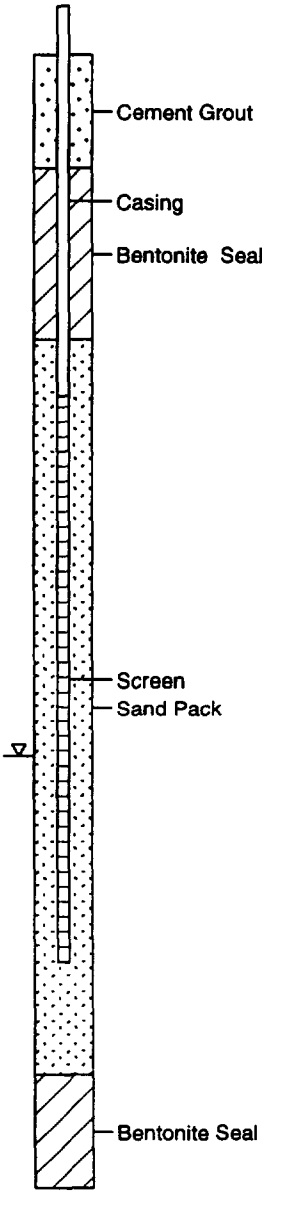
Log of Well HS-2 - Hot Spot #2

Enviro-Chem Site
Zionsville, Indiana

Date Drilled	: 10/19/98
Log By	: DVS
Drilling Company	: Earth Exploration
Driller	: Scott
Sampling Method	: Split Spoon
Drilling Method	: Auger
Screen Diameter	: 4"
Slot Size	: .20
Screen Length	: 10'
Casing Diameter	: 4"

Casing Length	: 6'
Casing Type	: PVC
Int. Water Level	: 9 (bgs)
4-Hr. Water Level	: 12.38 (bgs)

Depth in FEET	USCS	GRAPHIC	DESCRIPTION	Blow Count	PID READINGS (PPM)
0	FL		FILL: SAND, crushed stone (limestone), sand ,silt	5 4 3 4	0
2	CL-FL		CLAY FILL: Dense clay, organic-rich, brown, no odor no staining	2 3 3 4	0
4	CL-FL		CLAY FILL: Silty, some sand grains, organic plant material, slight odor	2 4 3 5	62
6	CL-FL		CLAY FILL: Silty, some fine sand, organic-rich, some discolorization, slight odor	2 2 3 2	37
8	CL		CLAY: Silt, quartz sand, organic plant material, gray-brown, slight odor, stratified and dense	1 1 2 2	81
10	CL		CLAY: Dense, gray homogenous, wet, slight staining	2 4	54
11	SM		SAND: Fine to coarse, coarsening downward,typical stream channel sequence, slight odor, slight staining	10 8	
12	GC		GRAVEL: pebbles to cobbles, rounded, quartz-rich, water bearing zone, black staining, slight odor	3 7 7 8	52
14	CL		CLAY: Silty, compressed zone with interbedded pebbles, top of sand lense, medium to coarse, slight odor	6 17 32 13	121
16	SM		SAND: Silty at top, medium to fine grained at bottom, quartz-rich, densely compacted glacial till, slight odor, no staining	27 35 32 38	4
18	MH		SILT: Densley compacted silty glacial till with sand and pebbles intermixed, no odor	27 33 51 49	2
20					



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12-04-1998

LOG OF BORING HS-2 - HOT SPOT #2

DRILL LOG HS-1A

PROJECT: ENVIRO-CHEM		OWNER: NA	SKETCH MAP:
LOCATION: ZIONSVILLE, IN		W.O. #: 2495-1010	ND - NOT DETECTED
BORING #: HS-1A	TOTAL DEPTH: 28'	DIAMETER: 8"	VPPM - VAPOR PARTS PER MILLION
SURFACE ELEV: NA	WATER LEVEL: NA	24-HRS: NA	SS - SPLIT SPOON
SCREEN DIA: 4"	LENGTH: 10'	SLOT SIZE: 0.020	F - FINE M - MEDIUM
CASING DIA: 4"	LENGTH: 17'	TYPE: PVC	C - COARSE
DRILLING CO: TOP FLIGHT	DRILLING METHOD: HSA		
DRILLER: NICK	LOG BY: VFB	DATE DRILLED: 03/16/98	NOTES:

DEPTH (FEET)	GRAPHIC LOG	WELL CONSTRUCTION	SAMPLE #	BLOW COUNT/ RQD/ %REC.	PID READING	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES, MOISTURE)
1						0'-7' GREY BROWN CLAY, LITTLE TO
2						TRACE SILT, TRACE F-C SAND, WET
3					50	DISTURBED, SLIGHT ODOR
4						7'-10' GREY CLAY, SOME SILT, TRACE F
5						SAND, TRACE M-C GRAVEL, DAMP, NO ODOR
6			SS-43	8-11	6	10'-10.2' BROWN M-C SAND, SATURATED,
7				12-12		NO ODOR
8			SS-44	10-11		10.2'-11.8' GREY CLAY, SOME SILT, TRACE
9				14-16		F-C SAND, DAMP, NO ODOR
10			SS-45	6-7	41	11.8'-12.4' BROWN M SAND, SATURATED,
11				8-14		NO ODOR
12			SS-46	11-12	11	12.4'-13.8' GREY CLAY, SOME SILT, TRACE
13				12-15		F SAND, DAMP, NO ODOR
14			SS-47	6-8	34	13.8'-14.4' BROWN M SAND, SATURATED,
15				12-14		SLIGHT ODOR
16			SS-48	5-4	15	14.4'-15.2' GREY & BROWN CLAY AND
17				12-12		SILT, TRACE F-C SAND/GRAVEL, DAMP
18			SS-49	10-11	15.7	15.2'-15.6' BROWN M SAND, SATURATED,
19				12-18		15.6'-17.8' GREY CLAY & SILT, TRACE
20			SS-50	9-10	3.5	F-C SAND/GRAVEL, DAMP, NO ODOR
21				10-11		17.8'-21' BROWN POORLY SORTED SAND,
22			SS-51	3-4	13	
23				7-12		21'-25' GREY CLAY, LITTLE SILT, DAMP,
24			SS-52	3-6	3	SLIGHT ODOR
25				10-10		

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DRILL LOG HS-1A

PROJECT: ENVIRO-CHEM		OWNER: NA	SKETCH MAP:
LOCATION: ZIONSVILLE, IN		W.O. #: 2495-1010	ND - NOT DETECTED
BORING #: HS-1A	TOTAL DEPTH: 28'	DIAMETER: 8"	VPPM - VAPOR PARTS PER MILLION
SURFACE ELEV: NA	WATER LEVEL: NA	24-HRS: NA	SS - SPLIT SPOON
SCREEN DIA: 4"	LENGTH: 10'	SLOT SIZE: 0.020	F - FINE M - MEDIUM
CASING DIA: 4"	LENGTH: 17'	TYPE: PVC	C - COARSE
DRILLING CO: TOP FLIGHT		DRILLING METHOD: HSA	
DRILLER: NICK	LOG BY: VFB	DATE DRILLED: 03/16/98	NOTES:

DEPTH (FEET)	GRAPHIC LOG	WELL CONSTRUCTION	SAMPLE #	BLOW COUNT/ RQD/ %REC.	PID READING	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES, MOISTURE)
26			SS-53	6-13	1	25'-25.3' BROWN SAND, SATURATED,
27				15-21		NO ODOR
28						25.3'-27' GREY CLAY, LITTLE SILT, NO
29						ODOR, DAMP
30						27'-27.3' BROWN SAND, SATURATED, NO
						ODOR
						27.3'-28' GREY CLAY, LITTLE SILT, DAMP,
						NO ODOR

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DRILL LOG HS-1

PROJECT: ENVIRO-CHEM		OWNER: NA	SKETCH MAP:
LOCATION: ZIONSVILLE, IN		W.O. #: 2495-1010	ND - NOT DETECTED
BORING #: HS-1	TOTAL DEPTH: 22'	DIAMETER: 8"	VPPM - VAPOR PARTS PER MILLION
SURFACE ELEV: NA	WATER LEVEL: NA	24-HRS: NA	SS - SPLIT SPOON
SCREEN DIA: 4"	LENGTH: 5'	SLOT SIZE: 0.020	F - FINE M - MEDIUM
CASING DIA: 4"	LENGTH: 11'	TYPE: PVC	C - COARSE
DRILLING CO: TOP FLIGHT		DRILLING METHOD: HSA	
DRILLER: NICK	LOG BY: VFB	DATE DRILLED: 03/12/98	NOTES:

DEPTH (FEET)	GRAPHIC LOG	WELL CONSTRUCTION	SAMPLE #	BLOW COUNT/ RQD/ %REC.	PID READING	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES, MOISTURE)
1						
2						0'-6' GREY AND BROWN CLAY, LITTLE
3					80	SILT, TRACE F-C SAND, WET, DISTURBED
4						PESTICIDE ODOR
5						
6			SS-18	8-15	54	6'-9.8' GREY CLAY, SOME SILT, TRACE
7				17-32		F-M SAND, TRACE F-M GRAVEL (WELL
8			SS-19	9-10	12.5	ROUNDED), DAMP, MOTTLED, SLIGHT ODOR
9				13-22		SORTED, SATURATED, NO ODOR
10			SS-20	5-5	20.4	9.8'-10' BROWN F-M GRAVEL, SATURATED,
11				17-12		SLIGHT ODOR (CHLORINATED SOLVENT)
12			SS-21	3-5	3.0	10'-12' GREY CLAY, SOME SILT, MOIST,
13				8-9		NO ODOR
14			SS-22	6-8	114.7	12'-12.2' BROWN F-M SAND & GRAVEL,
15				11-12		SATURATED, ODOR (CHLORINATED SOLVENT)
16			SS-23	3-4	ND	12.2'-14' GREY CLAY, LITTLE SILT, DAMP,
17				7-10		NO ODOR
18			SS-24	4-5	ND	14'-14.8' BROWN C SAND, STRONG ODOR
19				7-9		(CHLORINATED SOLVENTS)
20			SS-25	4-6	ND	14.8'-19.5' GREY CLAY, LITTLE SILT,
21				9-9		DAMP, NO ODOR
22						19.5'-19.6' BROWN F SAND, SATURATED,
23						NO ODOR
24						19.6'-22' GREY CLAY, TRACE SILT, DAMP,
25						NO ODOR
26						

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Versar INC.

ATTACHMENT B
Water Level Field Data

HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 12.410'			Well HS-2 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
Pre-test	0.0000	12.410	0.000	
1	0.0000	12.856	-0.446	
2	0.0166	12.847	-0.437	
3	0.0333	12.850	-0.440	
4	0.0500	12.850	-0.440	
5	0.0666	12.850	-0.440	
6	0.0833	12.847	-0.437	
7	0.1666	12.875	-0.465	
8	0.2500	12.894	-0.484	
9	0.3333	12.894	-0.484	
10	0.4166	12.913	-0.503	
11	0.5000	12.961	-0.551	
12	0.5833	13.065	-0.655	
13	0.6666	13.056	-0.646	
14	0.7500	13.037	-0.627	
15	0.8333	13.037	-0.627	
16	0.9166	13.037	-0.627	
17	1	13.103	-0.693	
18	2	13.503	-1.093	
19	3	13.683	-1.273	
20	4	13.759	-1.349	
21	5	13.826	-1.416	
22	6	13.883	-1.473	
23	7	13.930	-1.520	
24	8	13.959	-1.549	
25	9	13.987	-1.577	
26	10	14.006	-1.596	
27	20	14.120	-1.710	
28	30	13.189	-0.779	
29	40	13.360	-0.950	
30	50	12.980	-0.570	
31	60	12.210	0.200	
32	70	12.961	-0.551	
33	80	12.676	-0.266	
34	90	12.619	-0.209	
35	100	12.609	-0.199	
36	200	13.122	-0.712	
37	300	13.141	-0.731	
38	400	13.141	-0.731	
39	500	13.113	-0.703	
40	600	13.084	-0.674	
41	700	13.046	-0.636	
42	800	13.037	-0.627	
43	900	13.037	-0.627	
44	1,000	12.305	0.105	
45	1,200	12.153	0.257	
46	1,400	12.371	0.039	
47	1,600	12.486	-0.076	
48	1,800	12.562	-0.152	
49	2,000	12.600	-0.190	
50	2,200	12.657	-0.247	

HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 12.410'			Well HS-2 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
51	2,400	12.685	-0.275	
52	2,600	12.723	-0.313	
53	2,800	13.170	-0.760	
54	3,000	13.208	-0.798	
55	3,200	13.236	-0.826	
56	3,400	13.265	-0.855	
57	3,600	13.293	-0.883	
58	3,800	13.322	-0.912	
59	4,000	13.331	-0.921	
60	4,200	13.331	-0.921	
61	4,400	13.341	-0.931	
62	4,600	13.360	-0.950	
63	4,800	13.379	-0.969	
64	5,000	13.398	-0.988	
65	5,200	13.408	-0.998	
66	5,400	13.398	-0.988	
67	5,600	13.274	-0.864	
68	5,800	13.274	-0.864	
69	6,000	13.303	-0.893	
70	6,200	13.322	-0.912	
71	6,400	13.322	-0.912	
72	6,600	13.331	-0.921	
73	6,800	13.350	-0.940	
74	7,000	13.332	-0.922	
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HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 7.245'			Well HS-1 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
1	0.0000	7.245	0.000	
2	0.0166	7.235	0.010	
3	0.0333	7.245	0.000	
4	0.0500	7.235	0.010	
5	0.0666	7.235	0.010	
6	0.0833	7.235	0.010	
7	0.1666	7.235	0.010	
8	0.2500	7.245	0.000	
9	0.3333	7.235	0.010	
10	0.4166	7.245	0.000	
11	0.5000	7.245	0.000	
12	0.5833	7.245	0.000	
13	0.6666	7.245	0.000	
14	0.7500	7.245	0.000	
15	0.8333	7.245	0.000	
16	0.9166	7.245	0.000	
17	1	7.245	0.000	
18	2	7.245	0.000	
19	3	7.245	0.000	
20	4	7.245	0.000	
21	5	7.245	0.000	
22	6	7.245	0.000	
23	7	7.245	0.000	
24	8	7.245	0.000	
25	9	7.245	0.000	
26	10	7.245	0.000	
27	20	7.245	0.000	
28	30	7.245	0.000	
29	40	7.245	0.000	
30	50	7.245	0.000	
31	60	7.245	0.000	
32	70	7.245	0.000	
33	80	7.245	0.000	
34	90	7.245	0.000	
35	100	7.245	0.000	
36	200	7.226	0.019	
37	300	7.207	0.038	
38	400	7.170	0.075	
39	500	7.086	0.159	
40	600	6.889	0.356	
41	700	6.693	0.552	
42	800	6.533	0.712	
43	900	6.543	0.702	
44	1,000	6.939	0.306	
45	1,200	6.898	0.347	
46	1,400	6.833	0.412	
47	1,600	6.647	0.598	
48	1,800	6.824	0.421	
49	2,000	6.936	0.309	
50	2,200	7.001	0.244	

HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 7.245'			Well HS-1 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
51	2,400	7.048	0.197	
52	2,600	7.086	0.159	
53	2,800	7.104	0.141	
54	3,000	7.142	0.103	
55	3,200	7.151	0.094	
56	3,400	7.170	0.075	
57	3,600	7.188	0.057	
58	3,800	7.217	0.028	
59	4,000	7.235	0.010	
60	4,200	7.226	0.019	
61	4,400	7.226	0.019	
62	4,600	7.245	0.000	
63	4,800	7.245	0.000	
64	5,000	7.245	0.000	
65	5,200	7.254	-0.009	
66	5,400	7.254	-0.009	
67	5,600	7.245	0.000	
68	5,800	7.245	0.000	
69	6,000	7.235	0.010	
70	6,200	7.226	0.019	
71	6,400	7.217	0.028	
72	6,600	7.207	0.038	
73	6,800	7.198	0.047	
74	7,000	7.170	0.075	
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HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 8.410'			Well HS-1A Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
1	0	8.410	0.000	
2	240	8.300	0.110	
3	360	8.330	0.080	
4	720	8.140	0.270	
5	1080	8.040	0.370	
6	1200	8.110	0.300	
7	2400	8.600	-0.190	
8	2520	8.620	-0.210	
9	2640	8.640	-0.230	
10	2760	8.640	-0.230	
11	2880	8.640	-0.230	
12	3120	8.640	-0.230	
13	3360	8.640	-0.230	
14	3600	8.640	-0.230	
15	3840	8.640	-0.230	
16	4080	8.700	-0.290	
17	4320	8.700	-0.290	
18	4560	8.730	-0.320	
19	4800	8.730	-0.320	
20	5040	8.730	-0.320	
21	5280	8.730	-0.320	
22	5520	8.730	-0.320	
23	6000	8.730	-0.320	
24	6360	8.730	-0.320	
25	6720	8.730	-0.320	
26	7000	8.730	-0.320	
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HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 9.740'			Well S-2 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
1	0	9.740	0.000	
2	1200	9.420	0.320	
3	1920	9.540	0.200	
4	2280	9.720	0.020	
5	2400	9.800	-0.060	
6	2520	9.710	0.030	
7	2640	9.710	0.030	
8	2760	9.720	0.020	
9	2880	9.720	0.020	
10	3120	9.720	0.020	
11	3360	9.720	0.020	
12	3600	9.720	0.020	
13	3840	9.720	0.020	
14	4080	9.730	0.010	
15	4320	9.730	0.010	
16	4560	9.730	0.010	
17	4800	9.730	0.010	
18	5040	9.730	0.010	
19	5280	9.730	0.010	
20	5520	9.730	0.010	
21	6000	9.730	0.010	
22	6360	9.730	0.010	
23	6720	9.730	0.010	
24	7000	9.730	0.010	
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HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 4.400'			Well S-3 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
1	0	4.400	0.000	
2	60	4.340	0.060	
3	360	4.310	0.090	
4	390	4.240	0.160	
5	420	4.140	0.260	
6	450	4.140	0.260	
7	480	4.140	0.260	
8	540	4.140	0.260	
9	600	4.140	0.260	
10	660	4.140	0.260	
11	720	4.140	0.260	
12	840	4.140	0.260	
13	960	4.140	0.260	
14	1080	4.140	0.260	
15	1200	4.140	0.260	
16	1320	4.140	0.260	
17	1440	4.140	0.260	
18	1560	4.140	0.260	
19	1680	4.140	0.260	
20	1800	4.140	0.260	
21	1920	4.200	0.200	
22	2400	4.320	0.080	
23	2520	4.320	0.080	
24	2640	4.320	0.080	
25	2760	4.320	0.080	
26	2880	4.320	0.080	
27	3120	4.320	0.080	
28	3360	4.320	0.080	
29	3600	4.320	0.080	
30	3840	4.420	-0.020	
31	4080	4.420	-0.020	
32	4320	4.420	-0.020	
33	4560	4.420	-0.020	
34	4800	4.420	-0.020	
35	5040	4.420	-0.020	
36	5280	4.420	-0.020	
37	5520	4.420	-0.020	
38	6000	4.420	-0.020	
39	6360	4.420	-0.020	
40	6720	4.420	-0.020	
41	7000	4.420	-0.020	
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HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 2.900'			Well T-9 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
1	0	2.900	0.000	
2	15	2.720	0.180	
3	75	2.830	0.070	
4	420	2.710	0.190	
5	450	2.630	0.270	
6	1080	2.300	0.600	
7	1320	2.320	0.580	
8	1920	2.700	0.200	
9	2280	2.730	0.170	
10	2400	2.810	0.090	
11	2520	2.840	0.060	
12	2640	2.910	-0.010	
13	2760	2.900	0.000	
14	4080	2.920	-0.020	
15	4320	2.930	-0.030	
16	4560	2.930	-0.030	
17	4800	2.930	-0.030	
18	5040	2.930	-0.030	
19	5280	2.930	-0.030	
20	5520	2.930	-0.030	
21	6000	2.930	-0.030	
22	6360	2.930	-0.030	
23	6720	2.930	-0.030	
24	7000	2.930	-0.030	
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HS-2 Pumping Test Test Site: Enviro-Chem Location: Zionsville, Indiana Depth-to-water: 4.510'			Well IW-5 Readings Test Conducted on: 11-09-98 Test Conducted by: TK & TJW	
Reading	Pump test duration [min.]	Water level [ft]	Change in Water Level [ft]	Comments:
1	0	4.510	0.000	
2	210	4.230	0.280	
3	225	4.230	0.280	
4	240	4.230	0.280	
5	270	4.230	0.280	
6	300	4.230	0.280	
7	330	4.230	0.280	
8	360	4.100	0.410	
9	1080	4.000	0.510	
10	1920	4.230	0.280	
11	2400	4.440	0.070	
12	2520	4.510	0.000	
13	2640	4.510	0.000	
14	2760	4.510	0.000	
15	2880	4.510	0.000	
16	3120	4.510	0.000	
17	3360	4.510	0.000	
18	3600	4.510	0.000	
19	3840	4.600	-0.090	
20	4080	4.620	-0.110	
21	5040	4.620	-0.110	
22	5280	4.620	-0.110	
23	5520	4.620	-0.110	
24	6000	4.620	-0.110	
25	6360	4.620	-0.110	
26	6720	4.620	-0.110	
27	7000	4.620	-0.110	
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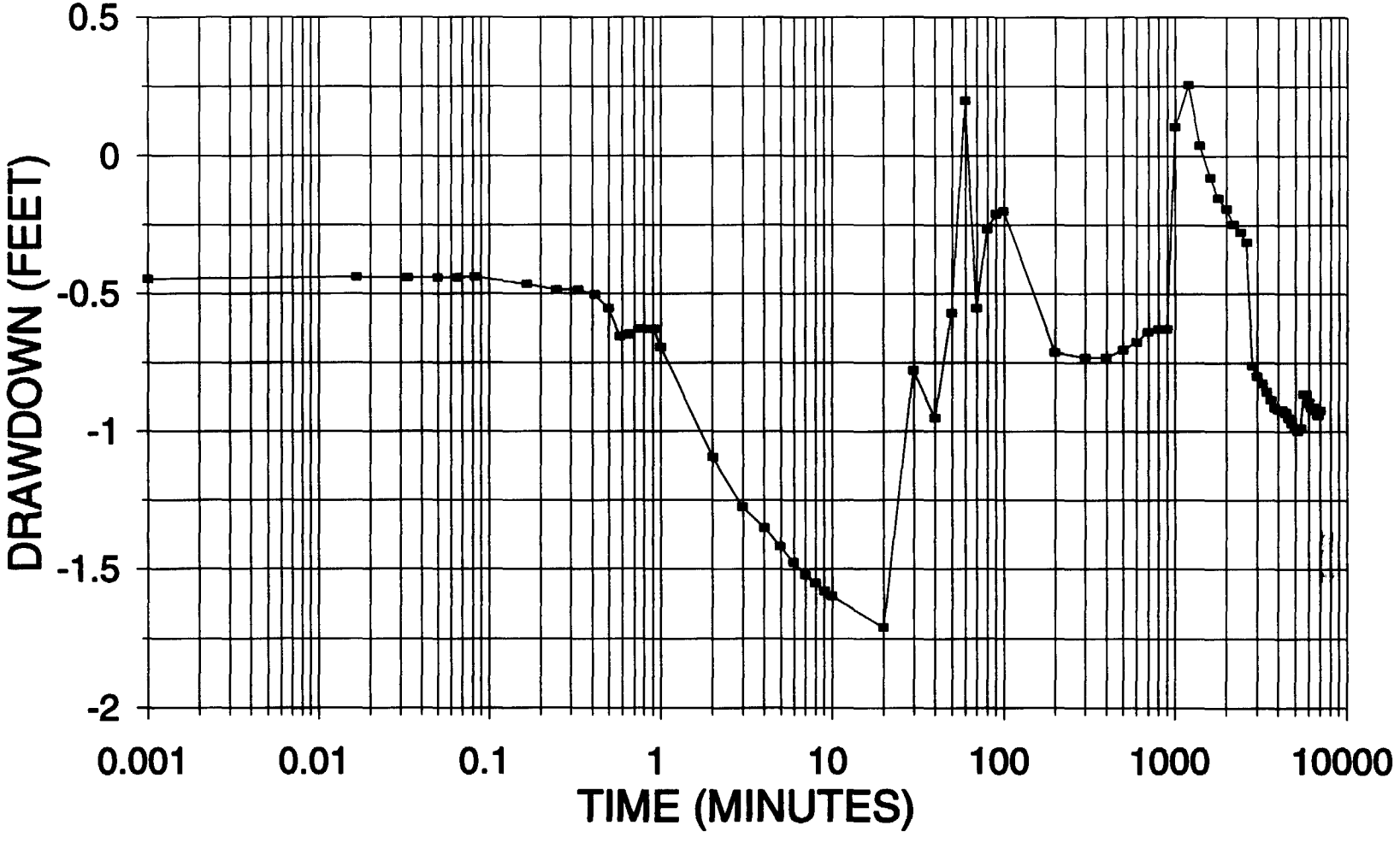
Versar INC.

ATTACHMENT C
Drawdown Versus Time Plots

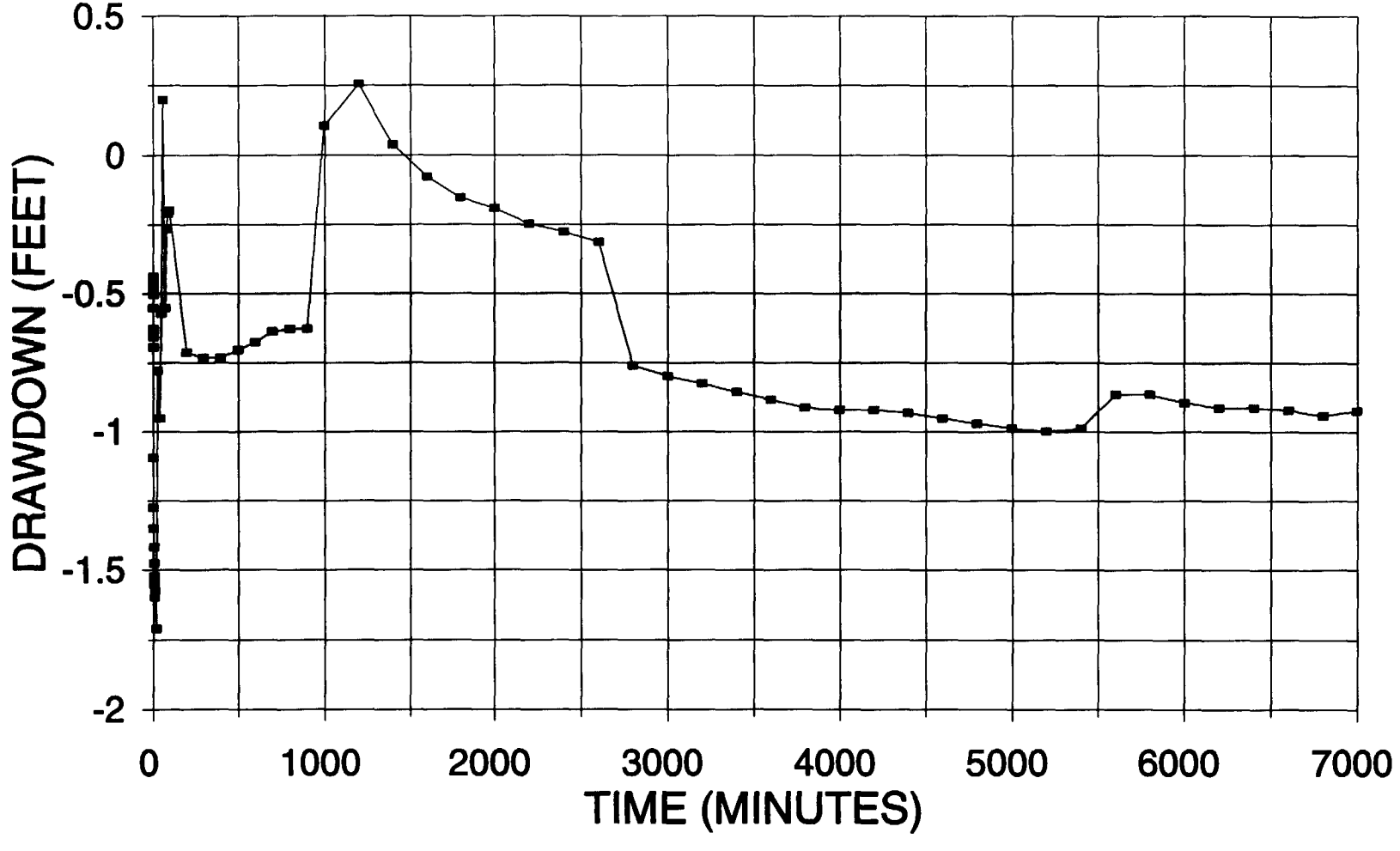
ENVIRO-CHEM SITE

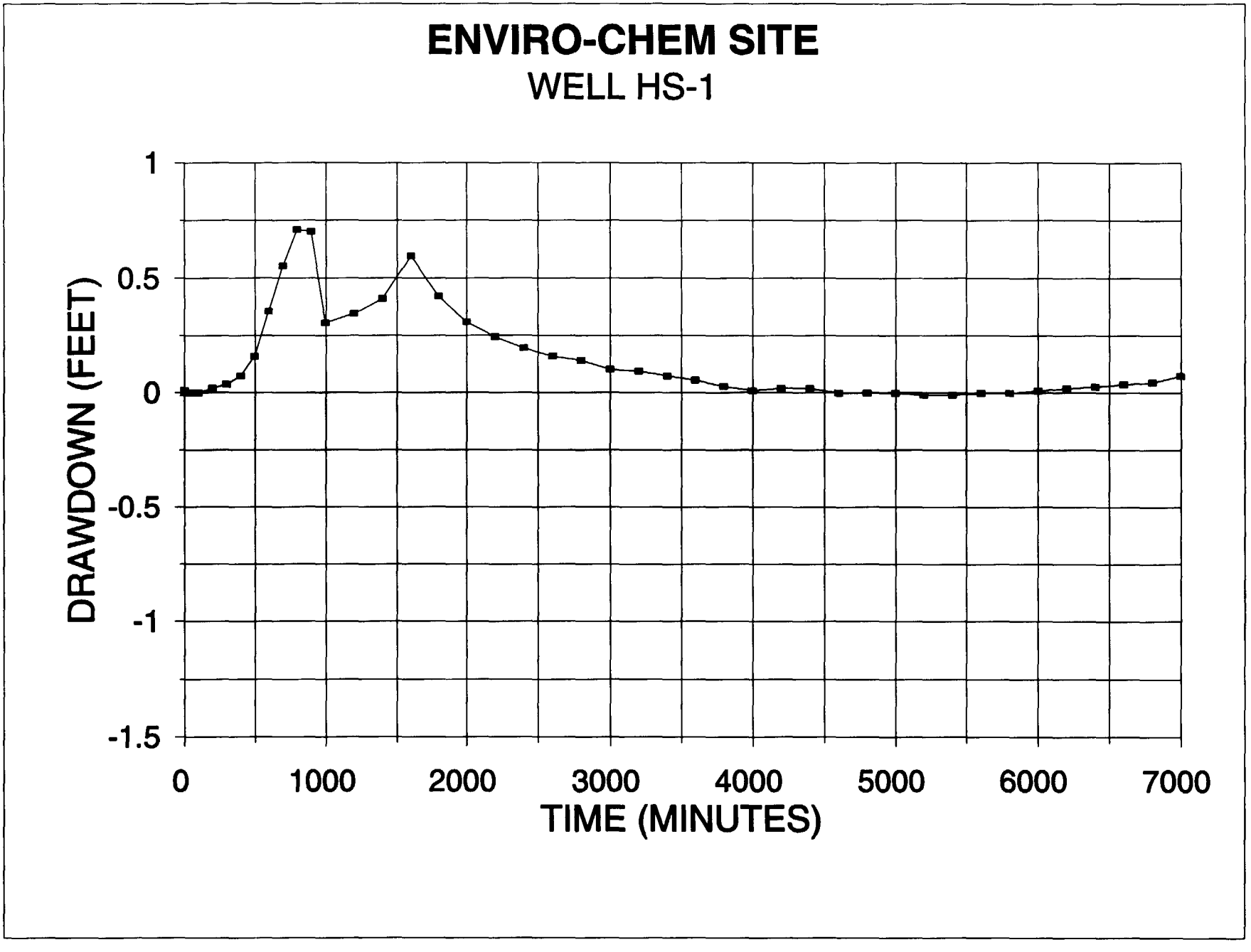
WELL HS-2

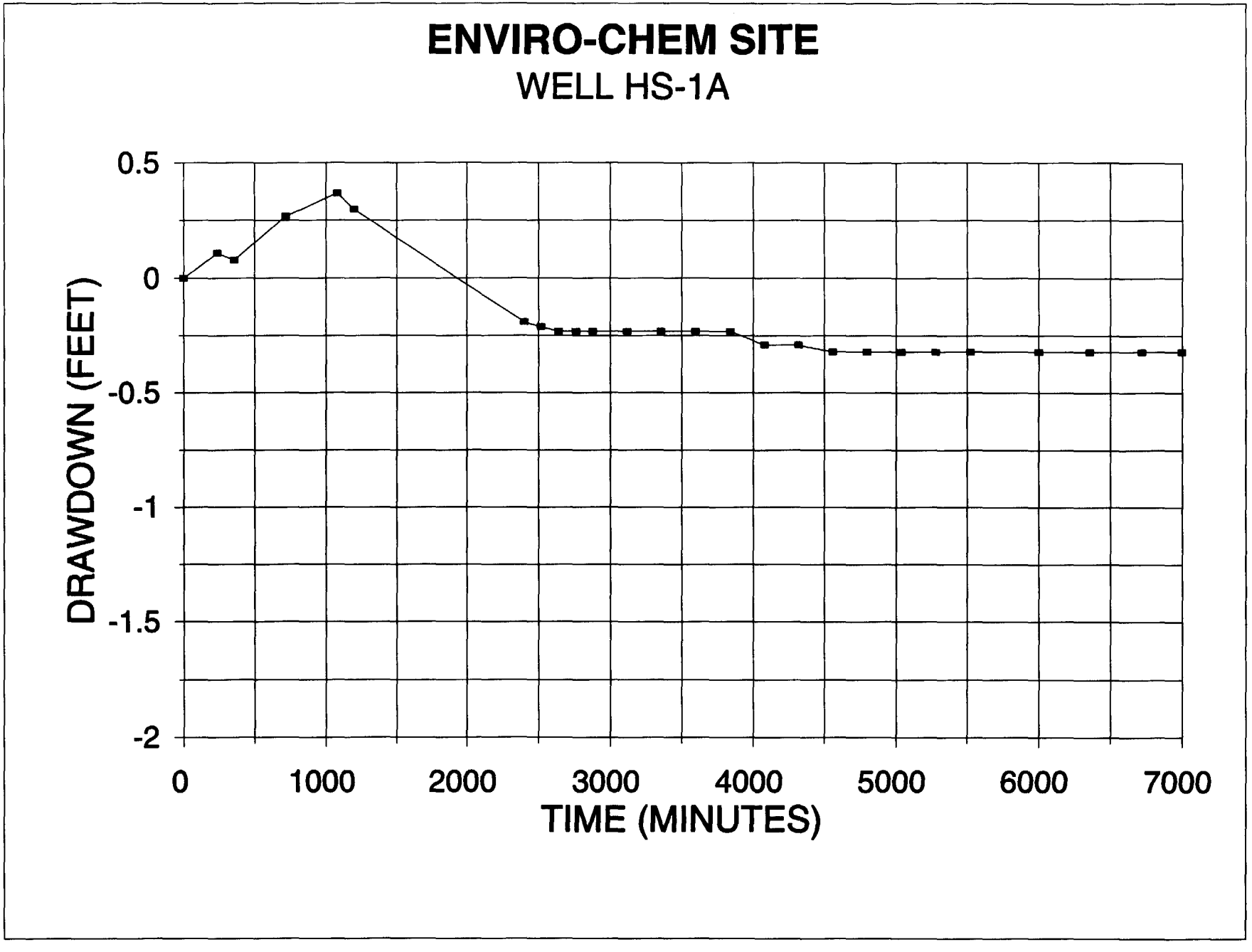


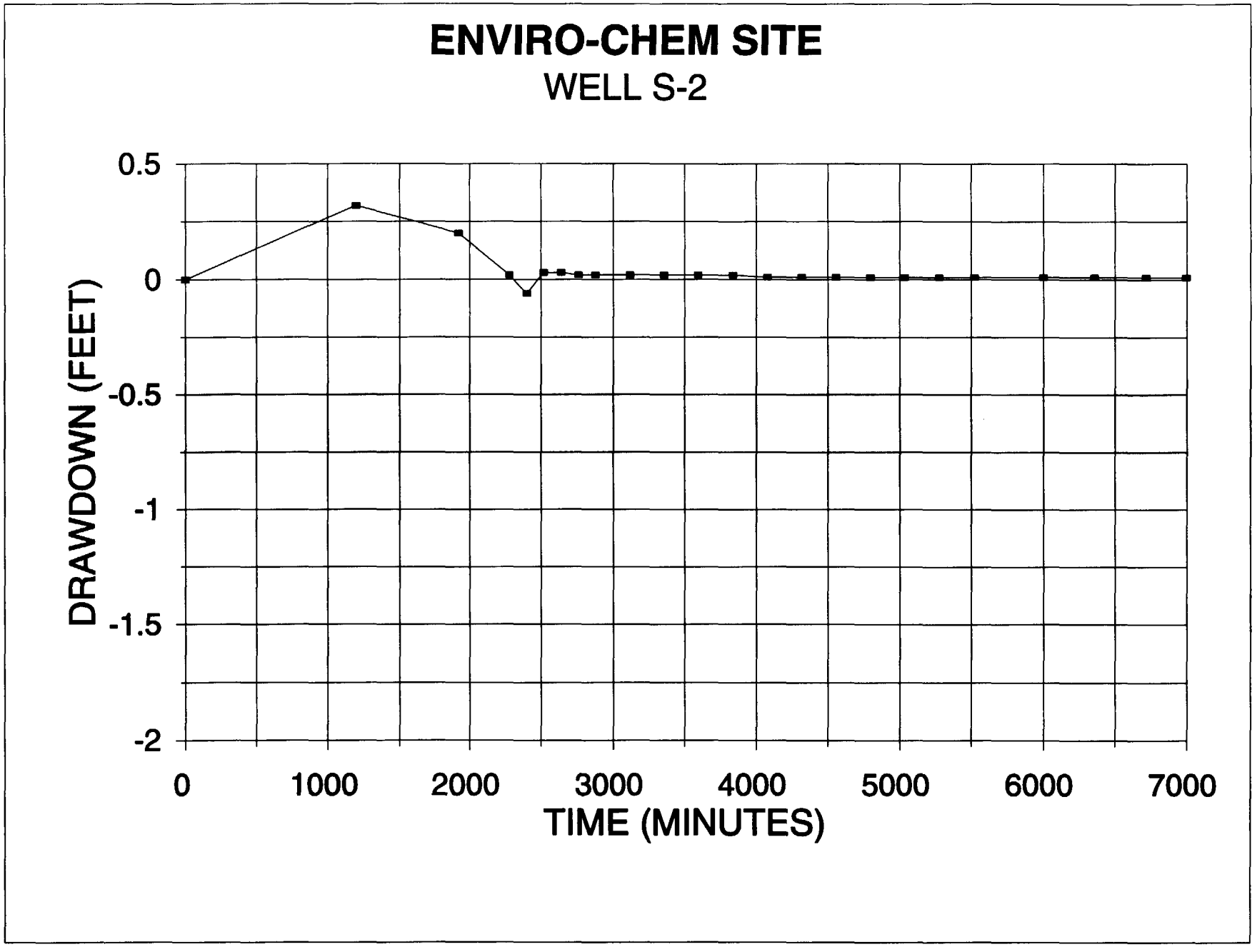
ENVIRO-CHEM SITE

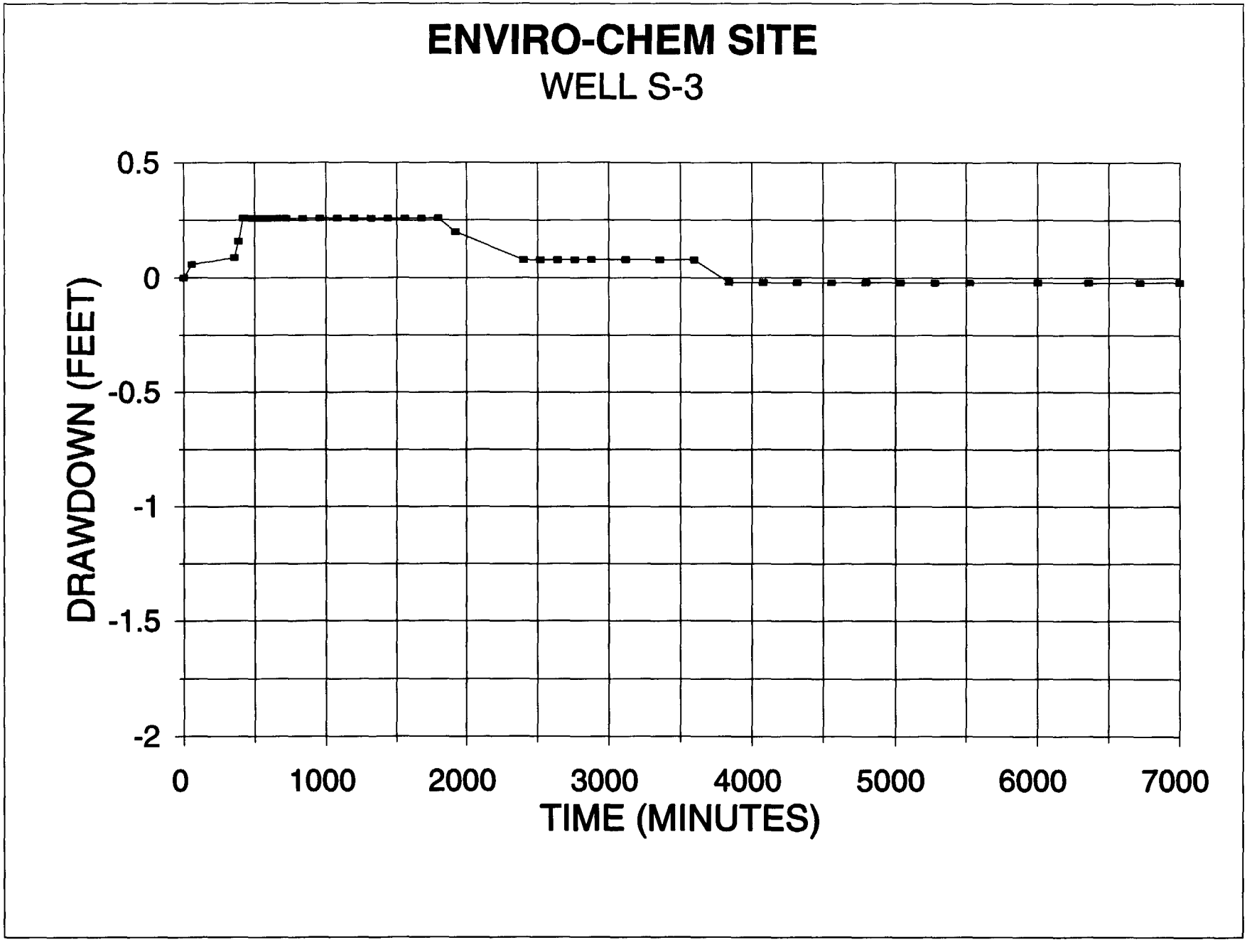
WELL HS-2

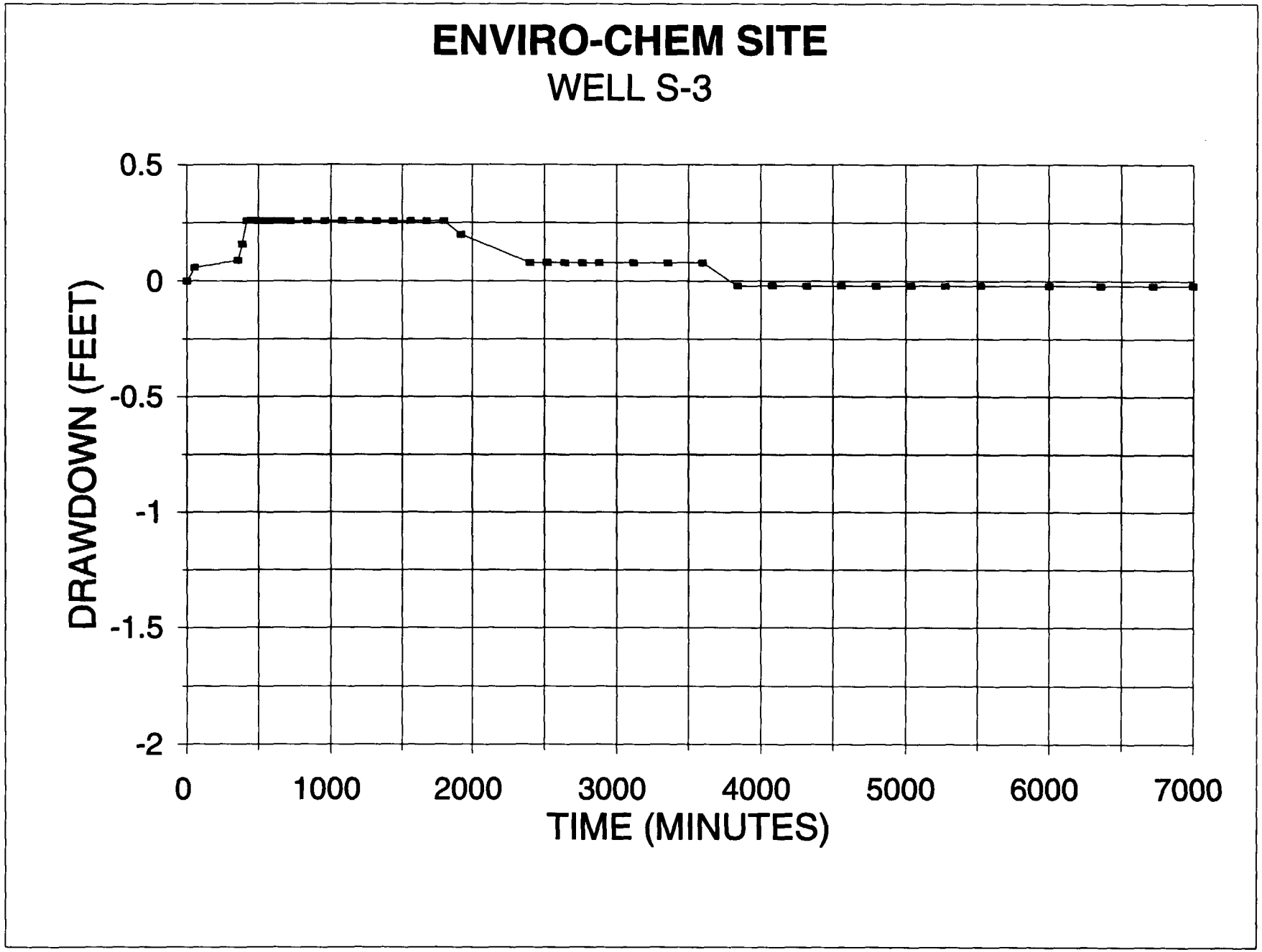



ENVIRO-CHEM SITE
WELL HS-1
DRAWDOWN (FEET)
1
0.5
0
-0.5
-1
-1.5
0
1000
2000
3000
4000
5000
6000
7000
TIME (MINUTES)


ENVIRO-CHEM SITE
WELL HS-1A
DRAWDOWN (FEET)
0.5
0
-0.5
-1
-1.5
-2
0
1000
2000
3000
4000
5000
6000
7000
TIME (MINUTES)

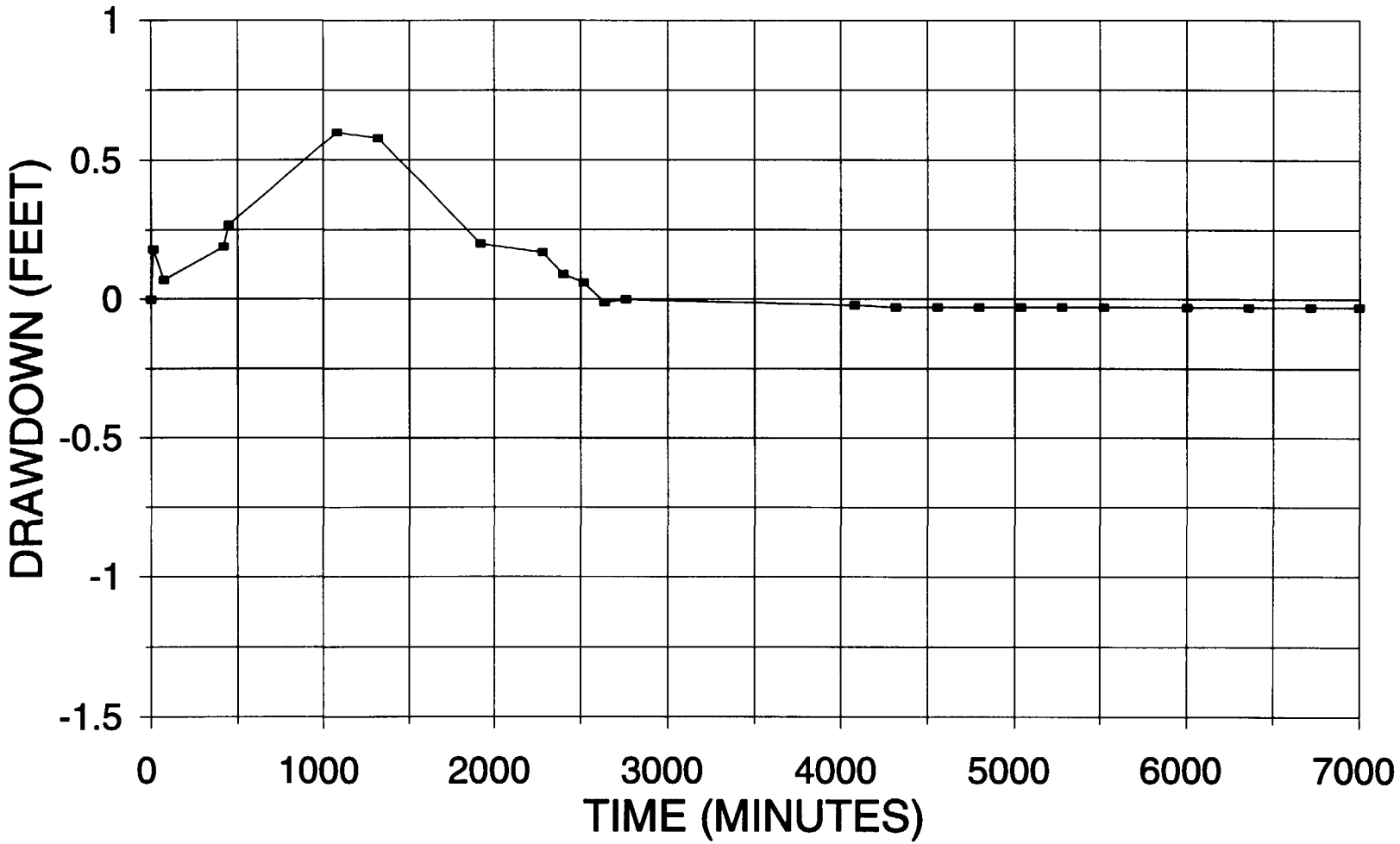

ENVIRO-CHEM SITE
WELL S-2
DRAWDOWN (FEET)
0.5
0
-0.5
-1
-1.5
-2
0
1000
2000
3000
4000
5000
6000
7000
TIME (MINUTES)


ENVIRO-CHEM SITE
WELL S-3
DRAWDOWN (FEET)
0.5
0
-0.5
-1
-1.5
-2
0
1000
2000
3000
4000
5000
6000
7000
TIME (MINUTES)


ENVIRO-CHEM SITE
WELL S-3
DRAWDOWN (FEET)
0.5
0
-0.5
-1
-1.5
-2
0
1000
2000
3000
4000
5000
6000
7000
TIME (MINUTES)

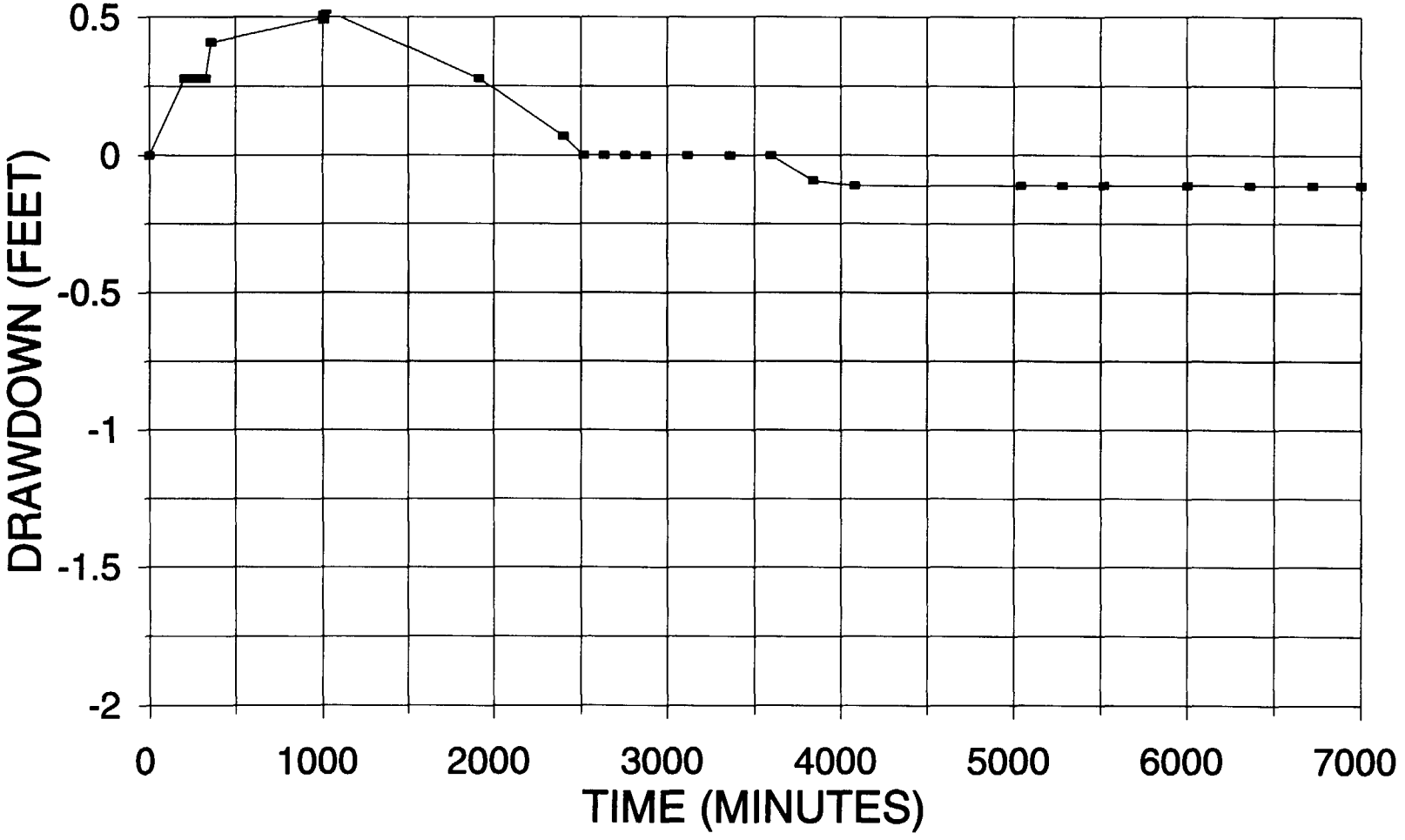
ENVIRO-CHEM SITE

WELL T-9



ENVIRO-CHEM SITE

WELL IW-5



Versar INC.

ATTACHMENT D
Hydraulic Conductivity Calculations

DATA SET: HS-2

CLIENT:	Enviro-Chem Site	DATE:	09-NOV-98
LOCATION:	Zionsville, Indiana	WELL NO.:	HS-2
COUNTY:	Clinton	WELL DEPTH:	18.00 ft
PROJECT:	Well Pump Test Data	WATER TABLE:	12.410 ft
AQUIFER:	Endless	THICKNESS:	5.59 ft
INTAKE RADIUS:	0.416 ft	CASING RADIUS:	0.167 ft
SCREEN TOP:	6.000 ft	SCREEN BASE:	16.00 ft
INITIAL HEAD:	1.159 ft	TRANS. RATIO:	1.0000

MODEL PARAMETERS:

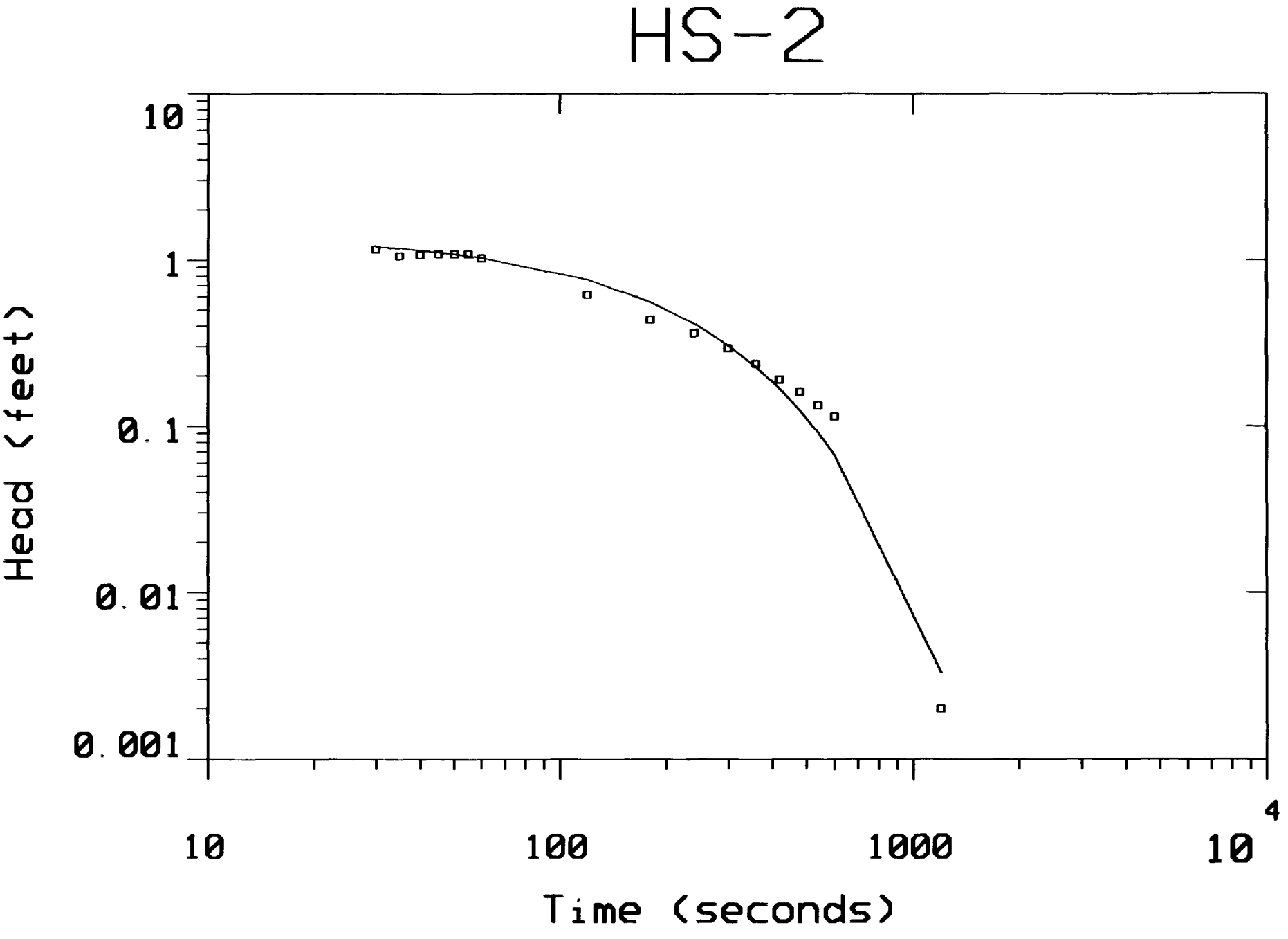
TRANSMISSIVITY: 6.55E-5 square ft/sec

CONDUCTIVITY: 1.17E-5 ft/sec

MODEL TYPE: UNCONFINED PARTIALLY PENETRATED AQUIFER (Bouwer & Rice)

No.	TIME (secs)	Head, H (ft) DATA	SYNTHETIC	DIFFERENCE (percent)
1	30.00	1.15	1.27	-10.13
2	35.00	1.05	1.24	-17.73
3	40.00	1.06	1.20	-13.58
4	45.00	1.08	1.17	-8.58
5	50.00	1.08	1.14	-5.65
6	55.00	1.08	1.11	-2.80
7	60.00	1.01	1.08	-6.52
8	120.0	0.617	0.780	-26.48
9	180.0	0.437	0.562	-28.64
10	240.0	0.361	0.404	-12.17
11	300.0	0.294	0.291	0.780
12	360.0	0.237	0.210	11.33
13	420.0	0.190	0.151	20.33
14	480.0	0.161	0.109	32.27
15	540.0	0.133	0.0785	40.94
16	600.0	0.114	0.0565	50.37
17	1200.0	0.00100	0.00213	-112.8

CURRENT RESOLUTION MATRIIX NOT AVAILABLE


HS-2
10
1
0.1
0.01
0.001
Head (feet)
10
100
1000
10^4
Time (seconds)

Versar INC.

ATTACHMENT E
Laboratory Analytical Results

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Greg Scarpone
HANDEX OF INDIANA
8579 Zionsville Rd.
Indianapolis, IN 46268

11/19/1998

NET Job Number: 98.07787

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: ENVIROCHEM

Sample Number	Sample Description	Date Taken	Date Received
224038	FT	11/10/1998	11/10/1998

National Environmental Testing, Inc. certifies that the analytical results contained herein apply only to the specific samples analyzed.

Lou Barnett
Project Representative

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Greg Scarpone
HANDEX OF INDIANA
8579 Zionsville Rd.
Indianapolis, IN 46268

11/19/1998

Sample No.: 224038
Job No.: 98.07787
P.O. NO.:

Sample Description: PT
Job Description: ENVIROCHEM

Date Taken: 11/10/1998 Date Received: 11/10/1998

Parameter	Result	Flag	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES-8260 (AQ)						
1,1-Dichloroethene	33		ug/L	out / 11/16/1998	SW 8260B	<5.0
cis-1,2-Dichloroethene	4000		ug/L	out / 11/16/1998	SW 8260B	<5.0
trans-1,2-Dichloroethene	130		ug/L	out / 11/16/1998	SW 8260B	<5.0
Ethylbenzene	120		ug/L	out / 11/16/1998	SW 8260B	<5.0
Methylene chloride	<10.		ug/L	out / 11/16/1998	SW 8260B	<10.
Tetrachloroethene	6.0		ug/L	out / 11/16/1998	SW 8260B	<5.0
Toluene	1600		ug/L	out / 11/16/1998	SW 8260B	<5.0
1,1,1-Trichloroethane	310		ug/L	out / 11/16/1998	SW 8260B	<5.0
1,1,2-Trichloroethane	<5.0		ug/L	out / 11/16/1998	SW 8260B	<5.0
Trichloroethene	<5.0		ug/L	out / 11/16/1998	SW 8260B	<5.0
Vinyl chloride	780		ug/L	out / 11/16/1998	SW 8260B	<2.0
SURR: Toluene-d8	92		88-110%	out / 11/16/1998	SW 8260B	
SURR: Dibromofluoromethane	83		86-118%	out / 11/16/1998	SW 8260B	
SURR: 4-Bromofluorobenzene	119		86-115%	out / 11/16/1998	SW 8260B	

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Greg Scarpone
HANDEX OF INDIANA
8579 Zionsville Rd.
Indianapolis, IN 46268

12/02/1998

NET Job Number: 98.07859

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: ENVIROCHEM

Sample Number	Sample Description	Date Taken	Date Received
224270	FT2	11/13/1998	11/13/1998

National Environmental Testing, Inc. certifies that the analytical results contained herein apply only to the specific samples analyzed.

Reproduction of this analytical report is permitted only in its entirety.

Project Representative

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Greg Scarpone
HANDEX OF INDIANA
8579 Zionsville Rd.
Indianapolis, IN 46268

12/02/1998

Sample No.: 224270
Job No.: 98.07859
P.O. NO.:

Sample Description: FT2
Job Description: ENVIROCHEM

Date Taken: 11/13/1998 Date Received: 11/13/1998

Parameter	Result	Flag	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES-8260 (AQ)						
1,1-Dichloroethene	54.		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
cis-1,2-Dichloroethene	4,300	e	ug/L	tjg / 11/25/1998	SW 8260B	<5.0
trans-1,2-Dichloroethene	180.		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
Ethylbenzene	110.		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
Methylene chloride	110.		ug/L	tjg / 11/25/1998	SW 8260B	<10.
Tetrachloroethene	8.9		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
Toluene	<5.0		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
1,1,1-Trichloroethane	1,000.	e	ug/L	tjg / 11/25/1998	SW 8260B	<5.0
1,1,2-Trichloroethane	<5.0		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
Trichloroethene	<5.0		ug/L	tjg / 11/25/1998	SW 8260B	<5.0
Vinyl chloride	1,700.	e	ug/L	tjg / 11/25/1998	SW 8260B	<2.0
SURR: Toluene-d8	102.		88-110%	tjg / 11/25/1998	SW 8260B	
SURR: Dibromofluoromethane	121.		86-118%	tjg / 11/25/1998	SW 8260B	
SURR: 4-Bromofluorobenzene	101.		86-115%	tjg / 11/25/1998	SW 8260B	